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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,881	09/23/2003	Robin E. Gorrell	58053US005	3599
32692	7590	03/29/2006	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			CHU, CHRIS C	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 03/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/668,881

Applicant(s)

GORRELL ET AL.

Examiner

Chris C. Chu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Request for Continued Examination

1. A request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 28, 2005 has been entered. An action on the RCE follows.

Response to Amendment

2. Applicant's amendment filed on October 26, 2005 has been received and entered in the case.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 4 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Wensel et al. (U. S. Pat. No. 6,291,899).

Regarding claim 1, Wensel et al. discloses in e.g., Fig. 4A a laminated flip-chip interconnect package (a package 36 in Fig. 4A and column 4, line 46) comprising

- a substrate (24; column 3, lines 38 – 39) having a chip attach surface (the top surface of the substrate 24 where the chip 26 is attached) and an opposing board attach surface (the bottom surface of the substrate 24; column 4, lines 64 – 65) that define contact pads (the pads under the solder ball 38 and pads on the top surface of the substrate 24 that are connected to the wire 30) for attachment to corresponding pads on the chip (26; column 3, line 40) and board (board; column 4, lines 64 – 65),
- wherein the board attach surface (at the bottom surface of the substrate 24) comprises
 - o a pattern of contact pads (the pads under the solder ball 38) opposite and “adjacent” a chip attach location (the area on the substrate 24 where the chip 26 is attached) on the chip attach surface except at least one solid plane area (at the area of the element 44; column 4, line 46) on the board attach surface,
 - o said solid plane area (at the area of the element 44) being “adjacent” to a corner of chip attach location (see Fig. 4A), and
- said board attach surface comprising a dielectric material (44; column 5, lines 5 – 7).

Regarding claim 4, Wensel et al. discloses in e.g., Fig. 4A a laminated flip-chip interconnect package (a package 36 in Fig. 4A and column 4, line 46) comprising

- a substrate (24; column 3, lines 38 – 39) having a chip attach surface (the top surface of the substrate 24 where the chip 26 is attached) and an opposing board attach surface (the bottom surface of the substrate 24; column 4, lines 64 – 65) that define contact pads (the pads between the solder ball 38 and the substrate 24, and pads on

the top surface of the substrate 24 that are connected to the wire 30) for attachment to corresponding pads on the chip (26; column 3, line 40) and board (board; column 4, lines 64 – 65),

- wherein the board attach surface (at the bottom surface of the substrate 24) comprises
 - o at least one solid plane area (at the area of the element 44; column 4, line 46),
 - o said area (at the area of the element 44) being opposite a chip attach surface region adjacent at least one corner of a chip attach location (see Fig. 4A), and
- said board attach surface comprising a metal (44; column 5, lines 5 – 7).

Regarding claim 5, Wensel et al. discloses in e.g., Fig. 4A said metal being copper (copper 44; column 5, lines 5 – 7).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2, 3 and 6 – 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wensel et al. in view of Jacobs (U. S. Pat. No. 6,294,407).

Regarding claims 2, 3, 6 and 7, while Wensel et al. discloses the use of the solid material (i.e., the dielectric or metal) on a solid plane area, Wensel et al. does not disclose a coverlay material. Jacobs teaches in e.g., Fig. 8 a solid material on a solid plane area (810; column 11, lines 28) being covered with a layer of a coverlay material (epoxy 130; column 7, lines 55 – 58).

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It would have been obvious to one of ordinary skill in the art at the time when the invention was made to apply the coverlay material (e.g., epoxy) to cover the solid material (e.g., the dielectric or metal) on the solid plane area of Wensel et al. as taught by Jacobs to prevent short circuits between conductive bumps (column 8, lines 2 – 4).

Regarding claim 8, Wensel et al., as modified, discloses a solder mask (130 of Jacobs) having a plurality of openings (132 of Jacobs) defining ball grid array pads.

Response to Arguments

7. Applicant's arguments filed on October 26, 2005 have been fully considered but they are not persuasive.

On page 7, applicant argues that the newly amended claim 1 includes the solid plane area being a discontinuity in the pattern of contact pads of the board attach surface. This argument is not persuasive because the newly amended claim 1 does not specifically claim that the solid plane area is a discontinuity area. Thus, a reasonable interpretation of the term “discontinuity” includes the structure taught by Wensel et al. Furthermore, Wensel et al. clearly shows in e.g., Fig. 4B the solid plane area (44A) having holes for the solder balls (38). Thus, the solid plane area (44A) of Wensel et al. is a discontinuity in the pattern of contact pads (the pads under the elements 38) of the board attach surface.

Furthermore, applicant argues that Wensel et al. does not disclose a pattern of contact pads opposite and adjacent a chip attach location on the chip attach surface except at least one solid plane area on the board attach surface, said solid plane area being adjacent to a corner of chip attach location. This argument is not persuasive. Wensel et al. clearly shows in e.g., Figs.

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4A and 4B a pattern of contact pads (the pads under the solder ball 38) opposite and “adjacent” (since the term “adjacent” is a broad term, a reasonable interpretation of the term “adjacent” includes the structure taught by Wensel et al.) a chip attach location (the area on the substrate 24 where the chip 26 is attached) on the chip attach surface except at least one solid plane area (at the area of the element 44; column 4, line 46) on the board attach surface, said solid plane area (at the area of the element 44) being “adjacent” to a corner of chip attach location (see Fig. 4A).

Finally, applicant argues that the cited references do not provide a motivation or suggestion. The argument is not persuasive because the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation was established by Jacobs, specifically in column 8, lines 2 – 4 (prevent short circuits between conductive bumps).

Since Wensel et al. and Jacobs disclose all the elements of the present invention, applicant’s arguments are not deemed persuasive.

For the above reasons, the rejection is maintained.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is 571-272-1724. The examiner can normally be reached on 11:30 - 8:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chris C. Chu
Examiner
Art Unit 2815

c.c.
Sunday, March 26, 2006



SPE Kenneth Parker